The Ohio Naturalist,

PUBLISHED BY

The Biological Club of the Ohio State University.

Volume IX. FEBRUARY, 1909. No. 4.

TABLE OF CONTENTS.

THE SPOROPHYLLS OF LESSONIOPSIS.

ROBERT F. GRIGGS.

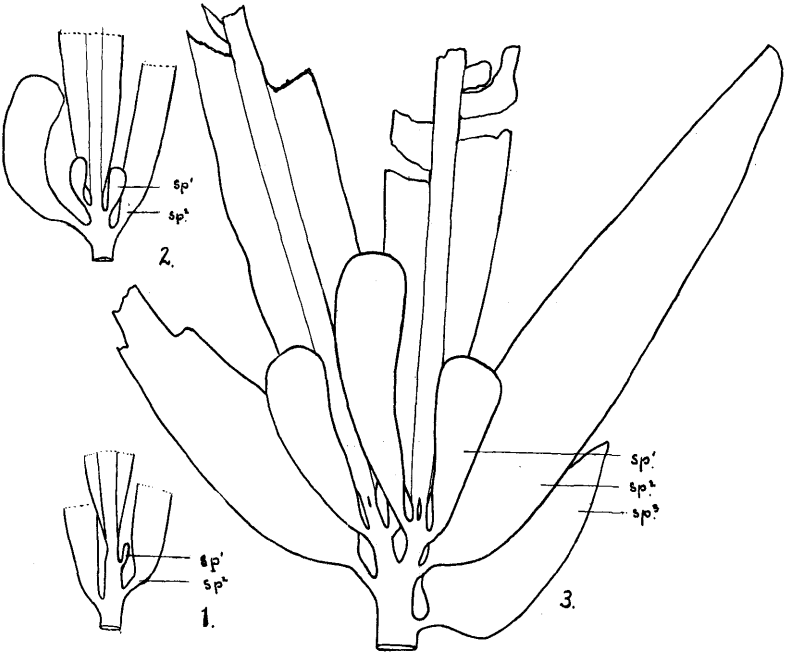
In a former paper on the development of Lessoniopsis litoralis (Griggs '09), the writer pointed out the fact that the division of the lamina by a basal perforation characteristic of the subfamily is always symmetrical involving the midrib and giving rise to two similar laminae each with a midrib in its centre. In such a process there is no place for the formation of sporophylls which lack the midrib. Since the former account was written material has come to my attention which shows the origin of sporophylls. This is a medium sized plant collected at the Minnesota Seaside Station early in July. Most of the sporophylls are already full grown but there are a number, especially on the smaller branches around the base of the plant, in all stages of development.

From branches with sporophylls of different ages it is at once apparent that they correspond with the sporophylls of such kelps as Alaria and Pterygophora. They are not cut off by splits in the transition region like the sterile laminae, but are outgrowths from the meristem below the base of the laminae. The youngest are mere knots roughening the edge of the stipe. These grow outward as in Pterygophora with scarcely any flattening till they reach about 1 cm. in length (fig. 1). But soon they begin to expand and each becomes a sessile spatulate blade (fig. 2). Under the protection of the surrounding laminae they reach about a decimeter in length (fig. 3) before the erosion of the waves begins to destroy the rounded tips. Up to this age

* Contributions from the Botanical Laboratory of Ohio State University, XXXIX.

they are usually falcate, widest at the extremity and cuneate at the base. After that length is reached they appear to grow more slowly and to broaden as well as lengthen till they are as long as ordinary laminae and have semicircular or subcordate bases (fig. 3).

The diverse modes of origin of the two kinds of laminae emphasizes the importance of the dimorphism of the laminae. This was the character which caused Reinke ('03) to separate this plant from Lessonia and erect for it the genus Lessoniopsis. It is apparent that this is as valid a genus as any of the kelps.



The origin of sporophylls in Lessoniopsis; about one-half natural size.

These proliferated sporophylls give Lessoniopsis a very great interest from a phylogenetic point of view, for in them this plant shows the characters of both of the principal lines of development in the kelps. In the Lessoniatae branching is accomplished exclusively by the perforation of the meristem as in the sterile branches of this genus. In the Alariatae it is brought about altogether by proliferations from the transition region; these give evidence that they were originally restricted to reproductive functions as in this plant and that their further development

into main branches, floats and photosynthetic areas as in Egregia, was accomplished by sterilization and modification of potential sporophylls. At first thought it might be supposed that Lessoniopsis, by the possession of the characters of both lines, should be regarded as representing a basal point from which both subfamilies had originated by following divergent lines of evolution. Such seems, however, an untenable view. There are none of the indications of a primitive character for Lessoniopsis. It is, in the judgment of the writer, clearly a member of the Lessoniatae. The characteristic branching of that series is the dominant character of Lessoniopsis and gives it the form and structure of its adult body, while the proliferated sporophylls do not make their appearance until the plant has practically completed its development. This is in great contrast to the Alariatae in which the sporophylls appear very early even in the lowest members where their function is almost exclusively reproductive and is not called into activity until maturity.

The unlooked for appearance of such a character among the Lessoniatae is to be considered as a striking example of the remarkable adaptability of the whole family of kelps by virtue of which we find in more than one plant structures belonging to lines otherwise entirely disconnected from it. This makes it difficult to construct a satisfactory classification of the genera because inconsistencies from this cause are almost unavoidable whatever principle of classification is used. The descent of the kelps seems to be a much interwoven fabric which has been surprisingly little divided up into narrower strands by the loss of plasticity by which each line is narrowed into its own special channel of evolution. This great variability along with many other features of the kelps leads to the view that the group is still in its youth and evolving rapidly.

LITERATURE.

GRIGGS, R. F., 1909. Juvenile Kelps and the Recapitulation Theory. Am. Nat. 43: 5–30.

REINKE, J., 1903. Studien z. Vergl. Entwickelungsgeschichte der Lamimaraiceen. Kiel.